Proliferation of Nuclear Weapons

Introduction

Nuclear weapons containment is at the heart of several programmatic goals of Los Alamos National Laboratory and Lawrence Livermore National Laboratory. The Laboratories are central players in safeguarding nuclear weapons. As part of this work, the Labs have established collaborative efforts with the former Soviet Union to develop comprehensive monitoring systems for nuclear materials and weapons. In addition, the Labs continue to work on developing ways to detect underground or otherwise hidden nuclear weapons production and test sites.

> *"A hundred generations have searched for this elusive path to peace, while a thousand wars raged across the span of human endeavour. Today that new world is struggling to be born. A world quite different from the one we've known. A world where the rule of law supplants the rule of the jungle. A world in which nations recognize the shared responsibility for freedom and justice. A world where the strong respect the rights of the weak. "*
>
> - President George Bush, 1990

This topic area focuses on our nation's ability to monitor and counter the proliferation of nuclear weapons. Built around the issue of who, what, and why political entities engage in the development of nuclear weapons, teams of teachers and students are asked to consider the production and disposition of nuclear materials sought and used by 1st, 2nd, and 3rd world nations.

> *Considering the devastation that would be visited upon all mankind by a nuclear war and the consequent need to make every effort to avert the danger of such a war and to take measures to safeguard the security of peoples,"....*

So begins the NonProliferation Treaty, signed at Washington, London, and Moscow on July 1, 1968. The end to the possibility of nuclear war. The end of testing of nuclear weapons, and thus the end of nuclear fear. Or so it seemed.

The "Cold War" continued for another quarter century. The two superpowers, the Soviet Union (soon to be dissolved) and the United States, amassed over 70,000 nuclear weapons. But dialogue was being pursued. New treaties were being discussed as people began to think they could see a light at the end of the tunnel. Talk shifted toward cleaning up the environmental legacy.

The world had watched in horror as the two superpowers neared the brink of Armageddon. The two superpowers began to change course and were now searching for an elusive path leading to peace. They began the walk towards disarmament, toward a safer world. They had learned their lesson during the "Cold War," a lesson that had a terrifying legacy and horrendous future. And yet, there were others who had not learned from their mistakes. Others who wanted to pursue what the superpowers were beginning to eliminate.

Today, events taking place on the Indian Subcontinent have changed the rules developed during the "Cold War." Limitations and interpretations of the treaties that were developed are being stretched and broken, if not legally, then morally. Pandora's Box has been reopened and the world must now move to contain it.

> *"Then another horse came out, a fiery red one. Its rider was given power to take peace from the earth and to make men slay each other. To him was given a large sword."* (Revelation 6:4)

Present solutions to the proliferation problem have been to limit the export of nuclear technologies. But the potential for proliferation still exists. Do we need to increase our efforts or look at other alternatives? Our future depends on resolving this issue. We must examine all facets of the problem and reach consensus, not only with ourselves, but with all factions having or considering a nuclear capability.

We must not let the unthinkable occur. We must strive to make the world a safer place to live.

Task Assignments for Proliferation of Nuclear Weapons

Task #1 – Motivation for proliferation or nonproliferation

> *"In the long history of the world, only a few generations have been granted the role of defending freedom in its hour of maximum danger. I do not shrink from this responsibility - I welcome it. I do not believe that any of us would exchange places with any other people or any other generation. The energy, the faith, the devotion which we bring to this endeavor will light our country and all who serve it - and the glow from that fire can truly light the world. And so, my fellow Americans: ask not what your country can do for you – ask what you can do for your country. My fellow citizens of the world: ask not what America will do for you, but what together we can do for the freedom of man. "*
>
> ..... John F. Kennedy
> - Inaugural Address (January 20, 1961)

Even though mankind has demonstrated disgust for war, they nevertheless have sought to develop more refined and deadlier weapons for eliminating their enemies. In the present world, humankind has developed weaponry that threatens its own existence and yet, there are those who seek to add this capability to their arsenal.

In August, 1945, nuclear weapons were used in war for the first time in history. Despite the demonstrated effects of these weapons, three nation states - the Soviet Union, Great Britain, and France - joined the "nuclear club" in rapid succession following the end of World War II. For a period of nearly fifty years, the world lived in what was termed a "Cold War," with two nuclear superpowers facing off from opposite sides of the globe. In the middle of this Cold War, the nation state China, joined the club. These countries now occupy the permanent seats on the United Nations Security Council.

Due to intense diplomatic efforts, and the collapse and break up of the Soviet Union in the 1990's, the Cold War was declared to be over. Yet, just as the nuclear superpowers began the process of drawing down and destroying their nuclear stockpiles, two additional nation states joined the nuclear club. In May, 1998, both India and Pakistan tested nuclear devices and declared themselves to be nuclear weapons states.

World wide hostility and friction have not ended. During the last fifty years, many conflicts have erupted between nation states such as; India/Pakistan, US/USSR, Argentina/Brazil, and within regions such as; the Middle East, and East Asia. The Cold War has ended, but the "race" continues.

To help us understand the issues surrounding the proliferation of nuclear weapons, we need to examine the factors that are involved in the decision whether to acquire nuclear weapons or not. Our first task, therefore, focuses on the issue of "motivation."

Your task is to consider what motivates the decision to pursue nuclear capability. You must examine decisions that have been made or that are being made by various nations today. Scrutinize these decisions in the context of nuclear proliferation, nonproliferation, and counter proliferation. Research and gather data, within the context of the four domains (science, economic, social/cultural, and political/geo-political), that help you build an understanding of the motivational issues behind these efforts.

1. Identify, describe and compare effects of nuclear proliferation efforts on a nation from the perspectives of the United States and another nation of your choice within the context of the four domains listed above.
2. Produce an overall analysis and definition of your position in regard to the motivations that are driving current decisions being made by the nations of the world to pursue a nuclear weapons capability (select two or three nations in addition to the United States, India and Pakistan for this collective study).

Suggested Classroom Activities for Task #1

The following activities and questions are "hooks" for the work which is to come. While they are intended to generate discussion and promote understanding of and interest in the task, they are not directed specifically at any task question.

1. Prepare for your examination of nonproliferation issues by viewing the classic films, "Fail Safe"and "Dr. Strangelove..". Discuss how failure of communication between countries, combined with a technology which eliminates human intervention, created the conundrum of this drama and farcical comedy. Could something like this really happen?
2. How do countries work together to discourage the use of nuclear weapons?
Rent and watch the movie "Hiroshima". The movie was a joint production by Japanese and American film companies. The events leading up to the bombing at Hiroshima are examined from both sides in this interesting and informative film.
3. Have the students play the "Nuclear War Card Game" (available for $24.95 from www.flyingbuffalo.com). Discuss the game and its rules. How closely might this approximate reality?
4. Invite a speaker to come to your class. The speaker could be from any number of organizations such as Physicians for Social Responsiblility, Atomic War Veterans, the Los Alamos Action Network, etc. Try to present all side of the issue, not just pro- or anti-nuclear views.

The following activities and questions are directed specifically at the task questions.

1. Have a mock meeting of the National Security Council of your "nation". Some possible members include the head of state, secretary of defense, secretary of state, head of the international intelligence agency, and secretary of the treasury. Have each of these members consider the pros and cons of pursuing a nuclear weapons program including relevant motivating factors. Each person might present "visuals" which capture and categorize the main points while convincing the other members of their point of view. Be sure to consider the four domains (political, scientific, social/cultural, and economic) in developing arguments.
2. Develop comparative charts or a database identifying nations and their nuclear capabilities. Refer to each of the domains.
3. The five permanent members of the UN Security Council are the "Big Five" nuclear states as identified by the Nonproliferation Treaty (NPT). Consider the following scenario:

You are one of the "Big Five" nations. As part of your political process, an election for your head of state is coming up this year. The two main candidates are on opposite sides of the nuclear issue. As a campaign management team, you must come up with a position on the following questions:

- What is the world's perception of the nuclear powers?
- Is nuclear status a determinant of great power status?
- What power does a nuclear state really have?
- Do we need nuclear weapons?
- What responsibility do we have to non-nuclear states?
- What are the benefits of being nuclear for our nation? The risks?

Now, prepare campaign materials like brochures, bumper stickers, position papers, and TV and newspaper ads defining your ideas on the future of your nation's nuclear program. Refer to the four domains.

4. Your firm has been hired as consultants to the government. You must prepare a report on the impact of developing nuclear weapons. You must answer the following questions:

- Why would you want nuclear weapons?
- Why have some nations with the capability chosen not to develop nuclear weapons (like Switzerland) and others to arm and then disarm themselves (like South Africa)?
- Would the world be a safer place if no nation had nuclear weapons? If all nations had nuclear weapons? Would this be a realistic goal?
- What kind of infrastructure is needed to develop nuclear weapons?
- What will it cost?
- What sacrifices would need to be made?
- How will it effect our international status? Can you truly be considered a great civilization today without having nuclear weapons?
- How could our nuclear capabilities be exploited within the framework of existing treaties and current power structures?

5. As a study group within a scientific society, you have been researching the legacy left by the development of nuclear power, including errors and accidents, and nuclear weapons, including their use in World War II and tests of them both above and below ground. Your present task is to develop a strategy for disseminating the results of your research. Design a plan for transferring this information internationally.

The preceding activities were based on the following questions. You may want to peruse these for ideas to help seed classroom discussion. You will notice that many of these questions have been incorporated into the activities.

1. Brainstorm, capture and categorize issues you feel would be relevant motivators for a nation to pursue/not-pursue a nuclear weapons program
2. Brainstorm, capture and categorize questions that need to be explored
3. Develop comparative charts or data base identifying nations and their nuclear capabilities Nuclear weapon states, nuclear capability states, non-nuclear states By nation with reference to each of the domains
4. Develop arguments that could have been used by the "Big Five" nuclear states for the development of their nuclear capabilities (work within the constructs of the four domains)
5. Considering that the five permanent members of the UN Security Council are the same as the five nuclear weapons states identified by the Nonproliferation Treaty, determine the significance of the following:

- What is the world's perception of the nuclear powers?
- Is nuclear status a determinant of great power status?
- What power does a nuclear nation really have?
- How much power does a non-nuclear nation have?
- Does a nuclear nation care how it is perceived by the rest of the world?
- Do great powers believe they need nuclear weapons? Why?
- The five members of the UN Security Council are all nuclear powers. Is it just a coincidence?
- How do you know?
- Why did South Africa arm itself with nuclear weapons? Why did it then disarm?
- Why do nations want nuclear weapons? Nuclear power? (think within the four domains)

6. What challenges will nations/the world likely face when reducing the number of nuclear weapons?

- Will the world be a safer place if NOBODY has ANY nuclear weapons?
- What would be considered a reasonable number of weapons for the US and Russia to maintain?
- What possibilities, positive/negative, might exist if all nations had nuclear weapons capability? (think within the four domains)

7. Consider this: Following the recent South Asian nuclear tests, a Japanese diplomat was heard to remark that Japan was now the only great civilization without nuclear weapons...

- What did he mean by that statement?
- What will this type of viewpoint mean for the future of nonproliferation?

8. Consider the few nations that have nuclear capability, but do not have a nuclear weapons program:

- Why do they chose to dismantle or discard plans for nuclear weapons capability?
- What might motivate them to change direction and begin a nuclear weapons program?

9. Consider the effect of the nuclear legacy on the nuclear weapons states.

- What were the lessons learned?
- What are the effects of these lessons on newly developing nuclear states?
- How can these lessons learned be transferred and applied without political repercussion?

10. What kind of national infrastructure would a nation have to have to be able to develop nuclear weapons? What sacrifices might be necessary?

11. The effects of nuclear weapons on both humans and the land have been studied in Japan and at national weapons testing sites.

- What have we learned from these studies?
- Does the knowledge of the effects of these weapons have an impact on a nation's decision to become a nuclear power?

12. Investigate the history of treaties in the 20th Century and detail which ones have been effective, which ones proved ineffective. Why?

Issues that may be included in your planning:

Scientific domain	**Economic domain**
· Technology · Status · Spin-offs · Weaponry · Environment · Energy	· Concessions · Status · Effects · Growth · Standard of living ·
Political domain	**Social/Cultural domain**
· Security · Status · Pride · Concessions · Military	· Status · Human nature · Religion · National pride · Standard of living

Task #2 – Technology

> *"In an enterprise such as the building of the atomic bomb the difference between ideas, hopes, suggestions and theoretical calculations, and solid numbers based on measurement, is paramount. All the committees, the politicking and the plans would have come to naught if a few unpredictable nuclear cross sections had been different from what they are by a factor of two."*
>
> ..... Emilio Segre
> - quoted in "Making of the Atomic Bomb"
> by Richard Rhodes

The "Industrial Age" has given way to the "Information Age". The advent of technology has increased the pace of this transition especially in the development of nuclear capabilities. Understanding of the atom has driven scientists in developing better ways to "see" the inner workings of the nucleus. From Aristotle to Newton, Rutherford and the Curies, to Einstein, Fermi, and Oppenheimer, scientists have continually attempted to further their understanding of our world (see the Historical Perspective section for more detailed work in this area).

Technology has aided the shift from the simple to the complex, from big to little, and from low yield to high yield. Delivery methods, whether it be for civilian or military purposes, have simultaneously simplified and added to the complexities of our daily lives.

Once the "arms race" began, the rush for developing bigger more powerful weapons in greater numbers contributed to emerging technologies. Treaties between the "nuclear nations" stopped traditional above-ground testing and forced nations to develop new technologies to ensure the reliability of their stockpiles. The high cost of these technologies was thought to be a deterrent to the development of nuclear capabilities, but recent history has proven this false.

As we consider proliferation and nonproliferation efforts, both military and civilian applications are motivators for a nation to pursue a nuclear capability. A nation may not have the fiscal resources to develop modern and sophisticated designs, but we must remember that weapons can still be developed with "old" technologies.

To help us gain an understanding of the level of technology necessary for developing and maintaining nuclear capabilities, we need to investigate the complexities of this issue.

Our second task focuses on the technologies embedded within the proliferation/nonproliferation/counter-proliferation efforts.

Your task is to consider issues surrounding the technologies needed to pursue nuclear capability. You must prepare researched responses to the questions listed below, within the context of the four domains (science, economic, social/cultural, and political/geo-political). The focus of this benchmark is the differing nuclear technologies that have been used or are being developed by various nations today. Research, gather data, and thoroughly demonstrate your understanding of the technologies and the technological issues.

1. Compare and contrast the technological efforts of developing a nuclear weapon in the United States during World War II and in Pakistan in the present era within the context of the four domains.
2. How is the use of technology different or the same in nuclear weapons proliferation, nonproliferation, and counter-proliferation efforts? How does the level of sophistication of technology affect the issue of stockpile stewardship?
3. Produce an overall analysis regarding a nation's program for acquisition and maintenance of technologies needed to develop or refine nuclear weapons programs (select two or three nations for this collective study).

Suggested Classroom Activities for Task #2

The following activities and questions are "hooks" for the work which is to come. While they are intended to generate discussion and promote understanding of and interest in the benchmark, they are not directed specifically at any benchmark question.

Prepare for your examination of nonproliferation issues by viewing the film "Fat Man and Little Boy" (research and do technical critique {Are they doing the science right?} or {take notes during the movie and write a "recipe" for creating a nuclear device with questions on what you will need to know.})

The following activities and questions are directed specifically at the benchmark questions.

1. As a museum curator in the year 2121; prepare exhibits about early nuclear weapons development in the United States and in Pakistan or India.
2. Produce an infomercial to collect donations for your nations program to acquire and maintain nuclear weapons.
3. As a Nuclear Engineer, write a proposal analyzing your nations program for acquisition and maintenance of the technologies necessary for the development or refinement of a nuclear weapons program. Be sure to consider the four domains and all relevant safety and security issues.
4. Your supervisor (Director of the CIA) has instructed you to chart the technological capabilities needed by different countries to either proliferate, nonproliferate, or counter-proliferated.
5. Create a web page linking the effect of technology on proliferation, nonproliferation, and counter-proliferation.
6. Produce comic strip(s) documenting early nuclear weapons development in the United States and Pakistan or India.
7. Investigate how nuclear weapons are made including the underlying technologies and resources needed. Make a model (schematic) of your bomb and attach an addendum summarizing how and where you will obtain the needed materials.

The preceding activities were based on the following questions. You may want to peruse these for ideas to help seed classroom discussion. You will notice that many of these questions have been incorporated into the activities.

1. Brainstorm technologies you feel would be relevant for a nation to pursue/not-pursue when developing a nuclear weapons program

2. Brainstorm questions that need to be explored

3. Develop comparative charts or data base identifying nations and their nuclear capabilities, the level of technologies they can afford within their fiscal means, the level of technology they are pursuing outside of their fiscal means

4. Compare the economic positions of the "Big Five" during the time that they developed their nuclear capabilities.

- How have these positions changed over the last four decades?
- How did the economic conditions during these time effect the other domains within these nations?

5. What technological challenges will nations/the world likely face when reducing the number of nuclear weapons?

6. Once a nation has a nuclear arsenal, how is it to be maintained?

7. What defines the concepts of reliability and safety within a nuclear arsenal? What part does technology play?

8. Does technology make a difference? Investigate methods of monitoring and surveillance (the technologies needed/used) that help to assure that treaties, particularly those regarding nuclear weapons and nuclear materials, remain viable.

9. What does a nation learn about its nuclear weapons by conducting nuclear tests?

10. What part does new missile technology play in the global concern for nuclear weapons proliferation?

- Why is this an issue? How does it relate to the four domains?

Task #3 – Global Concerns

> *"It's better to die on your feet, than live on your knees. "*
> ..... Dolores Ibarruri

> *"If we shake hands with icy fingers it is because we have burnt them so horribly before."*
> ..... Logan Pearsall Smith

Positions held by nations on the issues of proliferation, nonproliferation, counter proliferation and disarmament are argumentative and complicated. The belief systems, political and cultural, drive decisions made by geo-political entities that are reflected within global interactions. Positive interpretations of these interactions require cooperation and understanding between nations. Lack of knowledge and understanding leads to misinterpretations and fuels conflict.

The most common method of analyzing international positions and agreements is by examining existing treaties. Treaties have been written to address issues surrounding the development and proliferation of nuclear weapons. These include SALT, NPT, START, CTBT and others that create nuclear weapon free zones or no first use policies.

Treaties can be hard to enforce. Accountability and verification of compliance to treaty agreements presents a daunting task to the nations of the world. Several major international organizations deal with nuclear issues including the United Nations (UN), the International Atomic Energy Agency (IAEA), the Nuclear Suppliers Group (NSG) as well as a number of activist organizations.

Collaborative efforts between the nuclear superpowers have resulted in political and technological avenues that address the issues of accountability and verification. Ensuring the compliance to international agreements without infringing on the sovereignty of a nation can be a sensitive endeavor. Diplomatic issues must be considered in any negotiation surrounding treaty development and verification.

An informed citizenry that understands current global policies, motivations and situations is necessary for the development of comprehensive, effective policies that will shape the future of the nuclear world. Therefore, this task focuses on identifying and understanding concerns that confront the global community.

Your task is to explain the concerns of members in the global community regarding regional development and proliferation of nuclear weapons. This task focuses on the identification and analysis of global concerns. You will describe these concerns, examine them within the context of the four domains (scientific, political, social/cultural, and economic) and determine possible current and future implications for the world community.

1. Compare and contrast the implications of a current international treaty and its verification process dealing with proliferation/nonproliferation of nuclear weapons. Examine the treaty from the perspective of one nation in each of the following categories:

- "old nuclear" nations (the Big Five)
- "new nuclear": nations
- "non-nuclear": nations

2. Using the treaty you identified in question #1, examine the issues of accountability within the areas of security, safety, the environment, public health, and ethics. From the perspective of your 3 selected nations, prepare arguments on accountability issues that each nation would deliver at a United Nations forum.

3. Develop a collaborative paper regarding the development of a comprehensive, effective nuclear weapons nonproliferation treaty that will encompass all nations. Describe the elements that would ensure that the treaty would be ratified and adhered to by the global community.

Suggested Classroom Activities for Task #3

The following activities and questions are "hooks" for the work which is to come. While they are intended to generate discussion and promote understanding of and interest in the task, they are not directed specifically at any task question.

The following activities and questions are directed specifically at the task questions.

1. You are the executive producer of the TV show "Twentieth Century". You are doing a show on the effects of nuclear weapons and the current treaties controlling them. Prepare a script or show which describes the effects and explains the relevant treaties and assesses their effectiveness.

2. Consider the following scenario: Country A has recently developed a device which is capable of breaking any encryption code. Country B has been researching similar devices but has not been successful yet. Country C has an economy driven by information systems and banking and is, therefore, very intimidated by the invention of the device. Your task is to develop a treaty between these countries which will restrict the use of the device, limit or stop its proliferation, provide safety for other countries who are concerned about the use of the device, and verify all treaty points. Consider the four domains and the following questions:

- Why do international treaties work? Why not?
- What does it take to make a treaty successful?
- What incentives would make all these countries "join" the treaty?

3. Would you expect a car that has been sitting idle for 10 years to operate properly? Why or why not? What if you are given the job of keeping the vehicle in "running condition" but you are not allowed to actually start the car or drive it. Prepare a proposal that can accomplish your goal under the stated restrictions. Identify which elements involve maintenance, replacement, test modeling, etc.

4. As a new member of the LANL team, you are being groomed for a position in the stockpile stewardship team. Your mother is very proud of you, but your spouse, a physician member of "Physicians for Social Responsibility", is not comfortable with your new job. Survey the objectives of our stockpile stewardship program. Analyze why people might mistrust the intentions of the program and the mechanisms envisioned to reach the program's goals. Prepare a convincing argument to put before your spouse (over a candlelight dinner, of course).

The preceding activities were based on the following questions. You may want to peruse these for ideas to help seed classroom discussion. You will notice that many of these questions have been incorporated into the activities.

1. Brainstorm nuclear weapons issues you feel would be relevant to global concerns as a whole.

2. Brainstorm questions that need to be explored

3. List possibilities that would cause a nation determined to use nuclear energy for peaceful purposes to suddenly change its mind and embark on a weapons program

- What would it have to do?
- How would the rest of the world find out about it?
- What could the rest of the world do about it?

4. For what peaceful purposes might a country enrich uranium or reprocess plutonium? How can you tell when it's for peaceful purposes, and when they're trying to make a bomb?

5. Revisiting an activity from BM#1, investigate the history of treaties in the 20th century and detail which ones have been effective, which ones proved ineffective. Why?

- From the perspective of the four domains, give arguments why some international agreements have worked and others have not.
- What does it take to make an arms control treaty successful?
- Which areas seem to be weak and need of strengthening?
- What can be done to strengthen them?

6. Consider the impact of international treaties on a nation wishing to pursue a nuclear capability

7. What are the various international treaties negotiated to control nuclear arms proliferation? How effective is each?

- Can treaties be trusted? Why?
- What is the relationship between the NPT, CTBT, FMCT, and NWFZ treaties?
- What nonproliferation value is there in limiting the kinds of nuclear testing that can be done?
- What role does verification play in international treaties? What technical measures are available to verify compliance with various nuclear weapons treaties?
- What does a nations sacrifice by joining the CTBT?
- How would you repond to charges that no piece of paper ever protected the citizens of a nation from attack?
- It is a common conception that if there is a "breaking of the rules", that there must be some sort of punishment. What kinds of punishments are available when nuclear treaties are broken? What kinds of punishments can be administered to nations who have not signed the current treaties?

- How should the U.S. respond to claims that the NPT amounts to "nuclear apartheid"? (India statement)
- Why does so much effort go into constructing these kinds of treaties?
- Why did Argentina and Brazil both refuse to sign the Nonproliferation Treaty (NPT)?

8. What are the objectives of stockpile stewardship?

9. Why do other countries (and some Americans) mistrust the U.S. government because of the stockpile stewardship program? What do you think?

10. Is stockpile stewardship a monstrous evil or is it a responsible policy? Explain.

11. Is deterrence based on nuclear weapons availability ethical? Why

What political (social, economic) ramifications does this stance have on a nation?

12. What is a responsible policy that the world's nations ought to adopt on nonproliferation?

13. Consider this: "We are a multicultural world and we don't want to be."

- What implication does this quote have for the future of the world?
- How can nations with an ethnic majority pursue peaceful resolution to global concerns?
- What ramifications/implications does this statement have within a multicultural nation such as the United States?

14. How do we define the conditions so that a nation feels secure in a nuclear world?

15. How will the life support systems of the Earth be affected by varying degrees of nuclear exchange?

Would the effects on the world's ecosystems be irreversible?

Discussion topics

What	**Who**	**Why**	**When**
· environment · political stability · social stability · ethics · economic growth	· citizens · groups · politicians · rulers	· health · environment · safety · security	· current · short term · long term

Task #4 – Future Solutions

"My interest is in the future, because I am going to spend the rest of my life there."
..... Charles F. Kettering

"Who controls the past controls the future. Who controls the present controls the past."
..... George Orwell

What is our vision of the perfect world? How do we achieve this vision? How do we maintain it? Starting from the imperfect foundation of the present with all its complexities and animosities, human beings are hard pressed to construct a Shangrila or even a working model of this vision. However, it is imperative that we attempt to step off the precipice of nuclear destruction and strive towards a better, safer world.

Many vexing problems, such as global balance of power and international cooperation must be considered. Global and regional instability issues must be addressed and resolved. Mechanisms need to be developed to promote the peaceful use of nuclear technologies while constraining and/or preventing the use of nuclear weapons. The examinations of the impact of nuclear technology on the environment and the global economy must be made as we attempt to move into the future with a deliberate plan for global improvement.

In pondering the future of the nuclear world, we should realize that our present and future endeavors are built upon the experiences of the past. As we begin to speculate about new situations and scenarios, we need to step back for a moment and reflect on what we have learned from the previous benchmarks. In developing a vision of the nuclear world, we need to continue considering the past and current realities of the world in general as we begin to narrow our research for the resolution of specific areas of concern.

The role that things nuclear will have in future world will include

- the global environment
- nuclear weapons
- nuclear energy
- medical and industrial applications
- public attitudes and
- institutional responses

A vision of the future needs to be defined, one that can simultaneously reduce dangers while allowing the benefits from nuclear technologies to be realized. In order to create

such a vision, efforts should be focused to examine pathways leading to this future and to identify steps that could begin this process. Of particular interest are efforts in the area of proliferation and nonproliferation of nuclear weapons and possible impacts on important nuclear related areas of the future.

To help develop an understanding of the future of nuclear weapons proliferation/ nonproliferation, we need to synthesize the complexities of this issue. Our fourth task focuses on the future of the nuclear world as a result of the success of proliferation/nonproliferation/counter-proliferation efforts.

Your task is to develop visions for the future of nuclear weapons proliferation/ nonproliferation efforts that reflect global and regional concerns and understandings.

This task focuses on the identification and analysis of future scenarios. In developing visions for the future of the nuclear world, you will describe scenarios examine them with the context of the four domains (scientific, political, economic, and social/cultural). To determine possible current and future implications for the world community, teams need to consider the past and current realities of the world in general as they begin to focus their research results toward specific areas of concern.

1.Develop two written scenarios for the future. The first driven by nonproliferation efforts, the second by proliferation efforts. In both scenarios, identify the positive and negative implications that would occur in the interactions of the four domains. Teams should include the following issues in their vision:

- environmental
- economic growth
- political stability
- social stability
- accountability
- uses of nuclear materials and technology

Suggested Classroom Activities for Task #4

The following activities and questions are "hooks" for the work which is to come. While they are intended to generate discussion and promote understanding of and interest in the task, they are not directed specifically at any task question.

1. Preview one or more of the following videos/movies which have plot lines based on destruction of civilization by nuclear holocaust or some other catastrophe.
Video List

- Dr. Strangelove
- Silent Running
- Logan's Run
- Planet of the Apes
- Road Warrior
- The Day After
- etc.

Use segments or the entire video and have students:

- Analyze the possible causes of the scenario shown (include the four domains).
- Write a script for a sequel to the story presented.
- Create a solution to the problems illuminated in the first task.

2. Divide the team into four subgroups, each to address one of the following possible future perspectives:

- Nuclear proliferation with overall positive results
- Nuclear proliferation with overall negative results
- Nonproliferation with overall positive results
- Nonproliferation with overall negative results

Each subgroup will present and explain their work to the whole group in one of the different formats listed below. The whole group should provide feedback/critique to the presentation.

- Political cartoons
- Comic strips
- Short stories or fictional diaries
- News scripts
- History of 1999 from the perspective of a high school student in 2050.

3. Download the Nukefix program (http://www.nukefix.org) to a PC platform computer and use it with students to illustrate some of the different possible results of nuclear weapons use.